

THE Commission of the Municipal Council of Paris has drawn up a report on the working of the electric light, which has been printed, and was discussed on the 14th instant. A certain number of important facts are stated. A Jablochkoff lamp may be said to give a quantity of light equal to eleven gas lamps, consuming each 140 litres per hour. The quantity of gas consumed to produce the same quantity of illumination would be 1,540 litres per hour. The price paid by the city to the gas company for 1,000 litres being 0 fr. 15c., the expense would be of 0 fr. 23 c. The expenses of each Jablochkoff lamp are officially stated as follows, for 62 candles per hour of light, 77 horse-power:—Machinery, 3 fr. 20 c.; coals for working the several steam engines used, 6 fr. 64 c.; oil for lubricating, 1 fr. 23 c.; pay of men for changing candles and superintending illumination, 3 fr. 20 c.; expenses of 62 candles at 0 fr. 50 c. each, supposed to last during an hour, 31 fr. Total, 45 fr. 27 c., or 73 c. for each candle. The Commission proposes to pay to the Jablochkoff company—which accepts 0 fr. 30 c. per candle during one year—for 62 candles at the Avenue de l'Opéra, 15 on the Place de la Bastille, and 6 in a pavilion of the Halles Centrales: in all 83. The total number of burning hours is estimated at 2,073 for each of the street candles, and 4,000 for each of the pavilion candles: altogether, 55,000. The expense paid to the gas company for illuminating the same places is 21,041 fr. The excess of expense for the city will be 34,044 fr. But this credit is asked for in the interest of science. It is hoped that during one year the Jablochkoff company will realise material improvements, and it is supposed that other electric light companies will tender some fresh propositions for comparison. In the meantime, the Commission proposes to accept a tender made by the gas company to improve the illumination of the Rue du Quatre Septembre, Place du Château d'Eau, and a pavilion of the Halles Centrales, with an excess of consumption of 260,000 cubic metres. At the sitting of the 14th, the gas company refusing to accept the price offered to them as a compensation for their expenses, proposed to supply the gas gratis, which was agreed to. Consequently a regular competition will be carried on between gas and electricity before the Parisian public during one year, on a grand scale, at the expense of only 34,044 fr.

It was recently affirmed in the French Academy that chromic acid might be substituted for vanadic acid in the manufacture of aniline black. An industrial chemist of Rouen, M. Witz, now points out to the Academy (by recommendation of Prof. Girardin) that this is an illusion, and that vanadium is absolutely necessary. Chromium gives a greenish product quite different. M. Witz insists on the small quantity of vanadium which suffices to develop the reaction. It appears that the black is produced in presence of a weight of vanadic acid equal to only the *hundred millionth* part of the weight of the aniline employed. In practice, a thousandth of this weight is quite sufficient, and it will be seen that notwithstanding the high price of vanadium, the use of it in such small quantities is quite practicable for manufacture.

THE Anthropological Exhibition which will be held at Moscow next summer promises to be a highly interesting one. A large series of graphic illustrations of the life of prehistoric man will be supplemented by numerous models of caves, skeletons, and other prehistoric objects. So-called "kurgane" (prehistoric tombs) will be represented containing models of the skeletons and other objects found in them, their various positions being exactly reproduced. Prehistoric skulls will form a separate department of the Exhibition.

WE have received the *Proceedings* of the Cleveland Institution of Engineers, containing the address of the president, Mr. John Gjers, at the annual meeting of November 11. The address refers to various topics of much interest to engineers and even

to men of science. Among other things Mr. Gjers, speaking of the variation in the production of the soil, gives it as his opinion that it is undoubtedly connected with the variation in the number of sun-spots. The December number of the *Transactions* of the Institution of Engineers and Shipbuilders in Scotland contains a paper by Mr. James Howden, "On the Action of the Screw Propeller," followed by a long discussion, and another by Mr. W. G. Jenkins, "On the Scientific Form of Harbours as applied to the Port of Melbourne."

A FOREIGNER, who fears the disappearance of bears in the Alps, the killing of these animals being largely paid for in Switzerland by the State and by the communes, and several wild animals having already disappeared in Switzerland in this way, proposes to form a society which will pay for each disaster caused by bears, and prohibit the hunting of them.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. D. Orpen; a Black-faced Spider Monkey (*Ateles ater*) from South America, presented by Earl Brownlow, F.Z.S.; a Common Seal (*Phoca vitulina*) from Scotland, presented by the Earl of Hopetown; a Dufresne's Amazon (*Chrysotis dufresniana*), a Yellow-Fronted Amazon (*Chrysotis ochrocephala*) from South America, presented by Mrs. T. Smith; a Noddy Tern (*Anous stolidus*) from Ascension Island, presented by Morris H. Smyth Long, Lieut. R.N.; a Tuberculated Lizard (*Iguana tuberculata*) from the West Indies, presented by Dr. Stradling; a Superb Tanager (*Calliste fastuosa*), a Yellow-winged Blue Creeper (*Certha cyanea*) from South America, two Merrem's Snakes (*Liophis merremi*) from Monte Video, deposited; two Cuming's Octodons (*Octodon cumingi*), born in the Gardens.

#### ON THE LAVAS OF HEKLA, AND ON THE SUBLIMATIONS PRODUCED DURING THE ERUPTION OF FEBRUARY 27, 1878

BUNSEN in a Memoir "On the Processes which have taken place during the Formation of the Volcanic Rocks of Iceland," published in Poggendorff's *Annalen* in 1851, classifies the rocks of the island into two principal groups, which he calls respectively the *normal trachytic*, and the *normal pyroxenic*. The one possesses the largest proportion of acid, and the other of base, and their composition may be approximately stated in the following analyses:—

	Normal trachytic Composition.	Normal pyroxenic Composition.
Silica ... ..	76.67	48.47
Alumina and protoxide of iron ... ..	14.23	30.16
Lime ... ..	1.44	11.87
Magnesia ... ..	0.28	6.89
Potash ... ..	3.20	0.65
Soda ... ..	4.18	1.96
	100.00	100.00

The trachytic rocks represent a mixture of bisilicates of alumina and of the alkalis potash and soda, while protoxide of iron, lime, and magnesia are almost wanting. On the other hand, the pyroxenic rocks are basic silicates of alumina and protoxide of iron, in combination with lime and magnesia, and insignificant quantities of potash and soda. In the trachytic rocks the percentage of alumina is from 10 to 12, and that of protoxide of iron from 2 to 4; while in the pyroxenic rocks the percentage of alumina is from 10 to 18, and that of protoxide of iron from 12 to 20. Normal trachytic rocks are found in great abundance on the banks of the Laxá, at Langarfall, near the great geyser, and at Krafla in the north-east of Iceland.

The normal pyroxenic rocks are found on and around Hekla, on the banks of the Thjórðá, and at Thingvellir. Bunsen by an admirable induction, supported by a number of analyses, has proved that the rocks of Iceland which do not closely approximate in composition either to the normal trachytic or the normal pyroxenic, are intimate mixtures of these two classes of rocks,

and that hence in all probability there are but two separate volcanic foci.

Dr. Genth examined the various lavas from the western slope of Hekla, among them the lava erupted in 1845, which was found to contain—

Silica ... ..	56.76
Alumina and protoxide of iron ... ..	27.47
Lime ... ..	6.75
Magnesia ... ..	4.04
Potash ... ..	2.63
Soda ... ..	2.35
	100.00

The lavas of Hekla are trachytic rather than pyroxenic. In the geological map of Iceland which appears in von Leonhard's *Vulkanen Atlas*, a broad strip, including more than half the area of the island, is designated trachyte. It is inclosed by lines running approximately north-east by south-west,—that on the west from Skjalafandik to Reykjavik, and that on the east from Héraðfloi, to the Oræfa Jökull.

I was surprised when I visited the scene of the eruption of February 27, 1878 (*vide* NATURE, vol. xviii. p. 596), to find how precisely the lava of this eruption resembled a very old lava in close contiguity to it, but flowing from a distant crater. Moreover the lava of 1845, on the other side of the mountain, and more than four miles from the craters of 1878, was observed to be quite the same in character as the most recent lava, which undoubtedly possesses a composition differing but little from that of the analysis given above.

The most notable feature of the last eruption appears to be the quantity of hydrochloric acid evolved from the beds of lava, and the considerable sublimations of sesquichloride of iron. Bunsen asserts that hydrochloric acid plays a less important part in the volcanic phenomena of Iceland than at Vesuvius and Etna.

"The hydrochloric acid fumaroles," he writes, "which not unfrequently occur on a large scale near the Italian volcanoes, and are then generally accompanied by a very considerable sublimation of chloride of sodium, appear to be of less importance in Iceland. I was only able to detect traces of hydrochloric acid in a free state in the crater fumaroles a few months old, which owed their origin to the last eruption of Hekla" (in 1845), "as well as in the exhalations of vapour from the lava which was then erupted."

For the future we must recognize hydrochloric acid as one of the products of the volcanic action of Hekla. During the last eruption it was produced in considerable quantity.

I had not proceeded far by the side of the lava of 1878, erupted five months previously, before I saw patches of brilliant red and yellow sublimations on the lava. These I naturally mistook for sulphur, but on a closer approach, warm vapours of hydrochloric acid were found to be issuing from the lava, and the sublimations when removed from the lava speedily deliquesced, forming an intensely acid and corrosive solution of sesquichloride of iron. I only succeeded in bringing one specimen of this sublimate to England, and this can scarcely be wondered at, when we remember that it had to be carried over 150 miles of very rough and pathless country before reaching the sea-coast. Moreover, as ill-luck would have it, the pony which was carrying my minerals, took fright during the last hour of a journey of many days, and within a few miles of Reykjavik our final destination; the box containing the specimens was broken to pieces, and they were scattered on the ground, but fortunately without much injury.

The specimen of chloride of iron sublimate has been qualitatively analysed in our school laboratory, by H. M. Elder, who finds it to contain in addition to sesquichloride of iron and free hydrochloric acid, chloride of aluminium, and very small quantities of the chlorides of ammonium, sodium, and calcium.

During our journey to the scene of the eruption of 1878, we frequently saw large patches of this sublimate, and near one of the new craters, in an inaccessible portion of the lava field, an area of several hundred square yards was covered with it. Most clearly therefore a notable feature of the eruption of 1878 has been the emission of large quantities of hydrochloric acid.

The formation of this substance during the eruption is easy to account for. Sublimations of a white substance were frequently visible in the crevices of the new lava. These, according to Herr Nielsens of Eyraðakki, consist of chloride of sodium,

not of chloride of ammonium. Professor Silvestri found in different sublimations in the lava of Etna, erupted in 1865, quantities of chloride of sodium which varied from 50 to 90 per cent. (*I Fenomeni vulcanici presentati dall'Etna nel 1863-6*, page 139-142). Chloride of sodium, if it be heated in contact with silica and steam, undergoes decomposition, silicate of sodium and hydrochloric acid being formed. Bunsen has pointed out the fact that hydrochloric acid fumaroles can only exist when the high degree of temperature necessary for the decomposition of the chloride of sodium, has not receded far below the surface. For if it has so receded, the hydrochloric acid before reaching the surface will necessarily act upon the contiguous rocks, with the formation of chlorides which do not possess a sufficient degree of volatility to be brought to the surface. In the case of the sublimations in the lava of 1878, I noticed both free hydrochloric acid and sublimated chlorides, but the former was small in quantity, and no doubt the sublimations are receding deeper into the mass as the lava cools, and the next observer may find no trace either of the hydrochloric acid, or the sublimate of sesquichloride of iron.

G. F. RODWELL

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

IN addition to the regular course of instruction in the principles and practice of weaving at the Weaving Branch of the Glasgow Technical College, the Directors have made arrangements for three special courses of lectures which are now in course of delivery. These comprise a series on the history and development of the power loom, by Mr. John Watson, author of a "Treatise on Weaving"; another on Dyeing, by Mr. Noble; and a third series on Vegetable Fibres, by Mr. James Paton, F.L.S., Curator of Kelvingrove Museum.

THE Government of St. Petersburg, as we learn from the annual report just issued, had on December 1, 1878 (exclusive of the capital) 53 primary schools of the Ministry of Public Instruction, with 2,262 boys and 1,022 girls; 295 schools depending upon the School Boards, with 10,023 boys and 3,519 girls, and 21,975 yearly expenses; and about 30 schools of separate institutions, with 1,380 boys and 1,533 girls.

WE learn that a Russian lady, Mme. Berladskeya, has just received the degree of Doctor of Medicine at the University of Paris, after having defended at a public meeting her thesis, "On the Structure of Arteries." This paper was spoken of in the highest terms by Prof. Charcot. Mme. Berladskeya is the second lady who has received the degree of Doctor of Medicine at Paris, the first having been Mme. Goncharoff.

### SCIENTIFIC SERIALS

THE *Proceedings of the Linnean Society of New South Wales*. Vol. ii. part 4, and vol. iii. part 1. Part 4, vol. ii. contains: Prof. R. Tate, descriptions of three new species of helix from South Australia; Rev. J. E. Tenison-Woods, on the extra-tropical corals of Australia, three plates; the same, on the Echini of Australia, supplementary; W. Macleay, on the fishes of Port Darwin, four plates; John Brazier, on the mollusca of the Chevert expedition; the same, on some recently-found mollusca from Port Jackson and New Caledonia; E. P. Ramsay, on a new species of Rhipidura and of Eopsaltria from the Rockingham district, with remarks on some rare Queensland birds; the same, on a specimen of *Arses telescopthalmus*, on *Arses kaupi*, and on the young of *Cracticus quoyi*; the same, note on *Casuarinus australis*, one plate; W. Stephens, the President, the annual address. Part I, vol. iii. contains: E. P. Ramsay, on a new species of Ptilotis from Torres Straits; on a species of Myolestes from Fiji; notes on list of Australian birds; and descriptions of five new species of birds from Torres Straits and New Guinea; Rev. J. E. Tenison-Woods, on an Australian variety of *Neritina pulligera*; on a new genus (Arachnophora) of Milleporidæ; on a new species of Passamoseris; on a new species of Desmophyllum, and on a young stage of *Cycloseris sinensis*; on some Australian Littorinidæ; W. Macleay, note on a species of Therapon found in a dam at Warialda; on some new fishes from Port Jackson and King George's Sound; on a new species of Hoplocephalus; on the powers of locomotion in the Tunicata; C. Jenkins, on the geology of Yass Plains; Count de Castelnau, on the fishes of the Norman River.